

***Phases, Eclipses, and Tides***

The positions of the sun, Earth, and moon cause  
the phases of the moon, eclipses, and tides.

Moon's period of revolution: 27.3 days

Moon's period of rotation: 27.3 days

On the moon, 1 day = 1 year

The "far side" of the moon always faces away from the earth.

**I. Phases of the Moon**

A. Phases: the different shapes of the moon you see from earth

1. The moon has no light source of its own. The sunlight reflects  
light off the moon's surface.
2. The phase you see depends on how much of the sunlit side of the moon faces  
Earth
3. The cycle of phases is repeated every 29.5 days.

II. Eclipse: occurs when an object in space comes between the sun and a third  
object, and casts a shadow on that object

A. Two types of eclipses are solar and lunar

B. The moon's orbit is tilted (at 5° angle) with respect to Earth's orbit. The  
moon rarely goes directly between the earth and the sun.

C. Solar Eclipses

1. Occurs when the moon passes between the Earth and sun, blocking sunlight from reaching Earth
2. Umbra: the darkest part of the moon's shadow
  - a. People within the umbra experience a total solar eclipse
3. Penumbra: the larger part of the shadow
  - a. People within the penumbra experience a partial solar eclipse

#### D. Lunar Eclipses

1. Occurs at a full moon when the Earth is directly between the moon and the sun.
2. A total lunar eclipse occurs when the moon is in the Earth's umbra
3. A partial lunar eclipse occurs when the moon is in the Earth's penumbra

### III. Tides: the rise and fall of water, every 12.5 hours

A. Tides occur mainly because of differences in how much the moon pulls on different parts of the Earth

1. The force of gravity pulls the moon and Earth toward each other

#### B. High & Low Tides (See Figure 10, p. 33)

1. High tides are experienced on Earth at the point closest to the moon AND at the point farthest away from the moon.
2. Low tides occur at points between the two high tides.

C. Spring Tide: tide with the greatest difference between high and low

1. When the sun, Earth, and moon are in a straight line
  - a. occur during a new moon and a full moon

D. Neap Tide: tide with the least difference between high and low

1. when the sun is at a ninety degree angle to the line between the Earth and the moon.